MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2017/2018

PPS0016 – INTRODUCTION TO PROBABILITY AND STATISTICS

(All sections/ Groups)

1st JUN 2018
9:00 A.M. – 11:00 A.M.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of SIX printed pages including the cover page.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the answer booklet provided. All necessary working steps **MUST** be shown.
4. Statistical table is provided.

Question 1

(a) There are 100 durian trees in a durian orchard. The values listed below show the number of durians produced by 20 durian trees per season: -

65	67	74	52	59	63	61	73	69	60
74	59	75	72	79	66	73	68	67	62

(i) Construct a **frequency distribution table** using the **LOWEST** value in the table as lower limit for the first class. Use the Sturges' formula to estimate the number of classes. The table should also contain the class limits, class boundaries, midpoints, frequencies, the cumulative frequencies, midpoint times frequency(mf) and m^2f.

[7 marks]

(ii) How many percent of the trees produced more than 71 durians per season?

[2 marks]

(iii) Sketch a **histogram** for the frequency distribution.

[5 marks]

(iv) Estimate the **sample mean** and **standard deviation**.

[5 marks]

(b) Categorise the followings into discrete or continuous data:

Prices of books	Weight of apples	Number of participants
Time of travelling	Number of disks	Count of cats
Tickets for theme park	Length of tables	Height of students
Number of cars	Legs of animals	Thickness of bricks

[6 marks]

Question 2

(a) Consider the letters in the word MULTIMEDIA. How many distinct rearrangements can be formed if

(i) there are no restrictions?

[2 marks]

(ii) the letters L and T must be together?

[4 marks]

Continued ...

(b) What is the conditional probability that the sum of two dice will be greater than 9, given that the first die shows a 5? Draw a tree diagram to show the calculation.

[5 marks]

(c) The following shows the results of a survey on the two types of car preference of a group of 50 Malaysian:

30 like Malaysian car
x like Japanese car
5 like Malaysian and Japanese car
3 like neither Malaysian nor Japanese car

(i) Draw a Venn diagram to represent this data.

[4 marks]

(ii) Find the number of Malaysians who only like Japanese car.

[3 marks]

(d) An ABC company sampled 160 male and 120 female employees for uniform color preference survey (between Blue and Red). 110 of the male employee and 80 of the female employees chose Blue.

(i) Construct a two-way classification table for the information provided above. Use the sample table given below:

	Male	Female
Blue		
Red		

[4 marks]

(ii) Find the probability that a randomly sampled employee prefers Blue.

[1 marks]

(iii) Find the probability that a randomly sampled male employee prefers Blue

[2 marks]

Continued ...

Question 3

(a) A random committee of size 2 is selected from 3 executives and 2 managers.

(i) Find the probability mass function for the random variable X representing the number of executives in the committee.

[4 marks]

(ii) Determine the probability that X is at least 1.

[2 marks]

(iii) Find the mean of X.

[2 marks]

(iv) Find the standard deviation of X.

[4 marks]

(b) Suppose the cumulative distribution function of the variation of length (in mm) of table size is

$$F(x) = \begin{cases} 0; & x < 0 \\ \frac{x}{5}; & 0 \leq x < 5 \\ 1; & x \geq 5 \end{cases}$$

(i) Show that the above cumulative distribution function is VALID.

[3 marks]

(ii) Determine $P(X < 2.5)$

[3 marks]

(iii) Determine $P(0.5 < X < 3.5)$

[4 marks]

(iv) Determine $P(X > 4.0)$

[3 marks]

Continued ...

Question 4

(a) It is claimed that 30% of staffs in a particular organization are short sighted. Suppose that 10 staffs are selected at random. Let X be the number of staffs who are short sighted.

(i) Assuming independence, how is X distributed?

[2 marks]

(ii) Find the probability that X is at most 3.

[4 marks]

(iii) On average, of the 10 staffs selected, how many staffs should we expect to be short sighted?

[2 marks]

(b) The average number of foreign students in 5 foundation classes is 6. If the distribution of foreign students in each class is according to Poisson distribution, find the probability that:

(i) in 5 classes, there are 3 foreign students

[2 marks]

(ii) in 5 classes, there are at least 2 foreign students

[3 marks]

(iii)in 5 classes, there are less than 5 foreign students

[4 marks]

(c) If Z is a standard normal random variable, find

(i) $P(-0.60 < Z < 1.48)$

[2 marks]

(ii) the value of c such that $P(Z > c) = 0.07$.

[3 marks]

(d) Malaysia is running the 14th General Election. 52% of the population are in favour of choosing Mr. A as the prime minister. A random sample of 2000 Malaysians are selected for a survey, and asked if they would choose Mr. A as the next prime minister. What is the probability that more than half of those Malaysians would choose Mr. A?

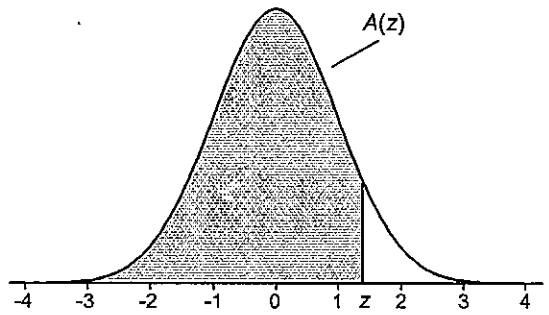
[3 mark]

End of Page

Appendix

TABLE A.1

Cumulative Standardized Normal Distribution



$A(z)$ is the integral of the standardized normal distribution from $-\infty$ to z (in other words, the area under the curve to the left of z). It gives the probability of a normal random variable not being more than z standard deviations above its mean. Values of z of particular importance:

z	$A(z)$	
1.645	0.9500	Lower limit of right 5% tail
1.960	0.9750	Lower limit of right 2.5% tail
2.326	0.9900	Lower limit of right 1% tail
2.576	0.9950	Lower limit of right 0.5% tail
3.090	0.9990	Lower limit of right 0.1% tail
3.291	0.9995	Lower limit of right 0.05% tail

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999							